State Of California The Resources Agency of California

Memorandum

Date : March 17, 2006
Telephone: (916) 653-1245

To: Joseph F. Desmond, Presiding Member
James D. Boyd, Associate Member
Susan Gefter, Hearing Officer

From: California Energy Commission - James W. Reede, Jr., Ed.D, Project Manager
1516 Ninth Street
Sacramento, CA 95814-5512

Subject : **PASTORIA ENERGY FACILITY EXPANSION PROJECT (05-AFC-1), SUPPLEMENTAL TESTIMONY**

Attached is Energy Commission staff's supplemental testimony in the subject areas of Air Quality, Hazardous Materials Management, Soil & Water Resources, and Transmission Systems Engineering. Staff previously submitted supplemental testimony with the Pre-Hearing Conference statement in the areas of Air Quality, Efficiency, and Soil & Water Resources and does not duplicate that testimony herein.

STAFF'S SUPPLEMENTAL TESTIMONY

MARCH 17, 2006

AIR QUALITY
ADDENDUM AND ERRATA

Second Supplemental Testimony of William Walters

INTRODUCTION

This addendum and errata provide revisions to the applicant's emission offset package in order to conform to US Environmental Protection Agency's (USEPA) comment regarding the interpollutant offset ratio calculation methods, and corrections to the specific Emission Reduction Credits (ERCs) proposed to be used by the project applicant. Additionally, a correction to the reporting requirement for staff condition **AQ-SC9** is being provided, and explanation of staff's findings on the San Joaquin Valley Air Pollution Control District's (SJVAPCD or District) Offset Equivalency Report are provided.

The revisions and errata provided in this analysis do not change any of the findings presented by staff in the Final Staff Assessment (FSA) and first supplemental testimony. Additions are shown in underline and deletions are shown in strikeout text. Staff concludes that with appropriate mitigation as recommended in the Conditions of Certification provided herein, and in the FSA, the proposed PEFE project would not result in significant air quality impacts.

EMISSION OFFSET PACKAGE

The applicant has revised their emission offset package to conform to the USEPA comment that the offset ratio for the project for the use of Oxides of Nitrogen (NOx) ERCs to offset PM10 (particulates of matter less than 10 microns in diameter) emissions should be based on the multiplication of the calculated interpollutant offset ratio and the distance offset ratio (PEFE 2006). This increases the offset ratio from 2.72 lb NOx : 1 lb PM10 to 3.33 lb NOx : 1 lb PM10 (SJVAPCD 2006a). This change affects the NOx and PM10 offset tables shown in the FSA, conditions of certification **AQ-44** and **AQ-45**, and Appendix A. The revised offset information for NOx and PM10 are provided below and the revised conditions are provided near the end of this addendum/errata.

NO_X EMISSION OFFSETS

AIR QUALITY Table 26 provides a summary of the total project NO_x emissions and identifies the project offset sources. ERC S-1554-2 was generated from the retrofit of 31 Internal Combustion Engines with pre-combustion chambers. ERC S-1543-2 was generated from the addition of oxygen (O_2) controllers to steam generators. <u>ERC C-481-2 was generated from steam generator conversions.</u>

AIR QUALITY Table 26
NO_x Offsets Available for the PEFE

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source	S-2165-2 [a] ~~S-1554-2~~	Pre-1990	104,902 ~~109,935~~	116,451 ~~121,484~~	122,889 ~~127,922~~	113,722 ~~117,272~~
Elk Hills Gas Plant, Kern County	S-1543-2	12/05/1990	10,354	8,381	11,018	11,467
Heavy Oil Projection Fields, Fresno County	C-481-2	3/1/1992	16,404	7,142	1,086	10,577
Shift NOx ERCs from Q3 to Q1	---	---	6,680	---	-6,680	---
Total ERCs Provided	---	---	138,340 ~~120,289~~	131,974 ~~129,865~~	128,313 ~~138,940~~	135,766 ~~128,739~~
Total Required @ 1.5:1	---	---	59,726	60,389	61,053	61,053
Balance Remaining ~~(S-1554-2)~~ [b]	---	---	78,614 ~~60,563~~	71,585 ~~69,476~~	67,260 ~~77,887~~	74,713 ~~67,686~~

Source: (PEFE 2006a, SJVAPCD 2006~~PEFE 2005h, DR28~~).
Note(s):
a – ERC S-1554-2 was split and S-2165-2 is from the same source as S-1554-2.
b - A zero balance means full mitigation, a negative balance indicates an offsets deficit, and a positive balance indicates offsets are available in excess of required offset levels. Please note that the offset balance is not the same as the ERC balance.

The project's offset proposal is in compliance with the District's NO_x offset requirements and is providing ERCs at a total offset ratio of 1.5:1 for the PEFE project, which meets staff's CEQA significant impact mitigation threshold that all non-attainment pollutants and their precursors be fully offset (i.e. minimum offset ratio of 1:1).

PM10 Emission Offsets

The applicant has proposed the use of NO_x for PM10 interpollutant offsets. The interpollutant ratio proposed by the applicant (2.22:1) is the same as that accepted by the District for the Pastoria Energy Facility (PEF) case, which was originally accepted for the La Paloma case in 1999. The District has since revised its approved calculation methods for the determination of appropriate interpollutant offset ratios. The applicant calculated a somewhat lower interpollutant offset ratio of 2.16:1 using the District's revised calculation procedure (PEFE 2005j DR 29), but maintained the higher 2.22:1 ratio proposal. The District, which approves interpollutant offsets on a case by case basis, reviewed the revised calculations and has provided ~~a preliminary~~ an approval of the applicant's proposed 2.22:1 interpollutant offset ratio for this case (SJVAPCD 2006a~~2005c~~).

AIR QUALITY Table 28 provides a summary of the total project PM10 emissions and identifies the project offset sources. NO_x ERCs ~~S-1554-2~~, as discussed above, have ~~has~~ been proposed to offset PM10 emissions.

AIR QUALITY Table 28
PM10 Offsets Available for the PEFE

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
See Air Quality Table 26 Balance Remaining ~~Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source~~	S-2165-2 S-1543-2 C-481-2 ~~S-1554-2~~	Pre-1990 12/05/1990 3/1/1992	78,614 ~~60,563~~	71,585 ~~69,476~~	67,260 ~~77,887~~	74,713 ~~67,686~~
Total Required @ 3.33:1~~2.72:1~~ [a]	**---**	---	64,735 ~~52,877~~	65,454 ~~53,464~~	66,174 ~~54,052~~	66,174 ~~54,052~~
ERC NO_x Balance Remaining [b]	**---**	---	13,879 ~~7,686~~	6,131 ~~16,012~~	1,086 ~~23,835~~	8,539 ~~13,634~~

Source: (PEFE 2006a, SJVAPCD 2006a)
~~From AFC (PEFE 2005a), Appendix F, Tables F-1 and F-2.~~
Note(s):
a. The District approved NO_x: PM10 ratio for PEF of 3.33:1~~2.72:1~~, which includes the interpollutant ratio of 2.22:1 and the distance ratio of 1.5:1. This final offset ratio conforms to USEPA's comment on the DOC that the interpollutant offset ratio and distance offset ratio should be multiplied to determine the final offset ratio.
b. A zero balance means full mitigation, a negative balance indicates an offsets deficit, and a positive balance indicates offsets are available in excess of required offset levels. Please note that the offset balance is not the same as the ERC balance. The applicant did not specifically note which of the three NOx ERC sources will retain the remaining balance, but staff believes that based on the date of reduction and the specific quarterly remaining totals that it would be ERC C-481-2.

The project's offset proposal is in compliance with the District's PM10 offset requirements and is providing ERCs at a total NOx for PM10 offset ratio of 3.33:1~~2.72:1~~ for the PEFE project, which meets staff's CEQA significant impact mitigation threshold that all non-attainment pollutants and their precursors be fully offset (i.e. minimum offset ratio of 1:1).

DISTRICT OFFSET EQUIVALENCY REPORT FINDINGS

The District's most recent Offset Equivalency Report (SJVAPCD 2005f) shows that the District has concluded that the District's New Source Review (NSR) program is providing an equivalent amount or more offsets than required by the federal NSR program. Staff's original concern regarding equivalency was based on the District being designated as an extreme ozone non-attainment area at the time the AFC was received. The federal offset requirements for an extreme ozone non-attainment area are such that the District's current offset trigger and offset ratios would not likely be able to show equivalency, regardless of other issues regarding pre-baseline or other ERC discounting requirements. Therefore, when this project began, staff did not believe that the District could continue to show NSR equivalency, and that this project would significantly impact those findings in the future considering the project's use of pre-baseline ERCs. The most recent equivalency report does not incorporate the PEFE project since it is not yet permitted.

The 1-hour ozone standard was revoked last year, which means that the District is no longer considered an extreme non-attainment area. The District's ozone non-attainment designation for the 8-hour standard is currently serious. The federal NSR offset requirements for a serious non-attainment area are much less severe than the extreme requirements. This change in non-attainment status will ease the ability to show equivalency between the District NSR and federal NSR programs, and mitigates

staff's original concern with regards to this project's future impact on NSR equivalency demonstrations.

The USEPA has not completed their review of the most recent Offset Equivalency Report. Additionally, they have not determined the non-attainment basis that they are going to consider in relation to this equivalency report which covers a period that is mainly prior to the revocation of the 1-hour standard. However, USEPA has noted that future NSR equivalency would be based on the 8-hour ozone standard non-attainment designation. USEPA's findings on the current equivalency report would not impact the offset requirements for this project, which are based on rule requirements at the time that the permit application was submitted; and as noted previously this project should not significantly impact future NSR equivalency due to the change in the ozone attainment status.

So, in summary, while the issue of NSR equivalency for the annual period may still be problematic on a District-wide level it will not affect the project offset requirements, and the project should not significantly impact future NSR equivalency demonstrations.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

No written comments concerning air quality have been received. This addendum and errata concerns the resolution of USEPA comments on the District's Determination of Compliance (DOC) and provides minor corrections to staff's testimony.

CONCLUSIONS

The conclusion provided in the FSA has not changed. Staff concludes that with appropriate mitigation, as recommended in the Conditions of Certification provided in the FSA and as amended in this addendum and errata, the proposed PEFE project would not result in significant air quality impacts.

CONDITIONS OF CERTIFICATION

Staff is noting an errata to one of the conditions of certification (**AQ-SC9** incorrectly required quarterly rather than annual reporting), and staff is recommending revised conditions **AQ-44**, **AQ-45**, and **Appendix A** of the FSA necessitated by the revision in the NOx to PM10 offset ratio and the applicant's revised offset package.

STAFF CONDITIONS

AQ-SC9 If the project owner does not participate in the voluntary California Climate Action Registry, then the project owner shall report on~~a quarterly~~ an annual basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production as follows:

The project owner shall maintain a record of fuel use in units of million-Btus (mmBtus) for all fuels burned on site for the purpose of power production. These fuels shall include but are not limited to: (1) all fuel

burned in the combustion turbines, (2) HRSGs (if applicable) or auxiliary boiler (if applicable), and (3) all fuels used in any capacity for the purpose of turbine startup, shutdown, operation or emission controls.

The project owner may perform annual source tests of CO_2 and CH_4 emissions from the exhaust stacks while firing the facility's primary fuel, using the following test methods or other test methods as approved by the CPM. The project owner shall produce fuel-based emission factors in units of lbs GHG per mmBtu of fuel burned from the annual source tests. If a secondary fuel is approved for the facility, the project owner may also perform these source tests while firing the secondary fuel.

Pollutant	Test Method
CO_2	EPA Method 3A
CH_4	EPA Method 18 (VOC measured as CH_4)

As an alternative to performing annual source tests, the project owner may use the Intergovernmental Panel on Climate Change (IPCC) Methodologies for Estimating Greenhouse Gas Emissions (MEGGE). If MEGGE is chosen, the project owner shall calculate the CO_2, CH_4 and N_2O emissions using the appropriate fuel-based carbon content coefficient (for CO_2) and the appropriate fuel-based emission factors (for CH_4 and N_2O).

The project owner shall convert the N_2O and CH_4 emissions into CO_2 equivalent emissions using the following IPCC Global Warming Potentials (GWP): 310 for N_2O (1 pound of N_2O is equivalent to 310 pounds of CO_2) and 21 for CH_4.

The project owner shall maintain a record of all SF_6 that is used for replenishing on-site transformers. At the end of each reporting period, the project owner shall total the mass of SF_6 used and convert that to a CO_2 equivalent emission using the IPCC GWP of 23,900 for SF_6.

On~~a quarterly~~ an annual basis, the project owner shall report the CO_2 and CO_2 equivalent emissions from the described emissions of CO_2, N_2O, CH_4 and SF_6.

Verification: GHG emissions that are not reported to the California Climate Action Registry shall be reported to the CPM annually in the fourth quarter as part of the Quarterly Air Quality Reports required by Condition of Certification AQ-65.

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (SJVAPCD 2006a)

AQ-44 ERC Certificate Numbers S-2165-2, S-1543-2 and C-481-2 (or certificates split from these certificates) shall be used to supply the required NOx and PM10 offsets, ERC Certificate Number N-444-1 and S-1666-1(or certificates split from these certificates) shall be used to supply the required VOC offsets and ERC Certificate Number S-1344-5 (or a certificate split from this certificate) shall be used to supply the required SOx, unless a revised offsetting proposal is received and approved by the District, upon which this Determination of Compliance shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Determination of Compliance. [District Rule 2201]

~~ERC Certificate Numbers S-1554-2 and S-1543-2 (or certificates split from these certificates) shall be used to supply the required NO_x and PM10 offsets, ERC Certificate Number S-444-1 and S-1666-1(or a certificates split from these certificates) shall be used to supply the required VOC offsets and ERC Certificate Number S-1334-5 (or a certificate split from this certificate) shall be used to supply the required SO_x, unless a revised offsetting proposal is received and approved by the District, upon which this Determination of Compliance shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Determination of Compliance. [District Rule 2201]~~

Verification: At least 60 days prior to commencing GTE first fire, the project owner shall surrender the identified ERC certificates and in the amounts shown in **AQ-43** to the District and provide documentation of that surrender to the CPM. Changes to the offsetting proposal must be provided to the District and CPM for review, public noticing, and approval.

AQ-45 NOx ERCs may be used to offset PM10 emission increases at a ratio of 3.33 lb NOx : 1 lb PM10. [District Rule 2201]

~~NO_x ERCs may be used to offset PM10 emission increases at a ratio of 2.22 lb NO_x : 1 lb PM10 for reductions occurring within 15 miles of this facility, and at 2.72 lb NO_x: 1 lb PM10 for reductions occurring greater than 15 miles from this facility [District Rule 2201]~~

Verification: At least 60 days prior to commencing GTE first fire, the project owner shall surrender ERC certificates to the District and provide documentation of that surrender to the CPM, which confirms that the interpollutant offset ratios prescribed in **AQ-45** have been met.

REFERENCES

PEFE (Pastoria Energy Facility Expansion) 2005j – Data Response Set 2. Submitted to the California Energy Commission on August 11, 2005.

PEFE (Pastoria Energy Facility Expansion) 2006. Offset Package Revision Letter to Mr. Thomas Goff, SJVAPCD, from Barbara McBride, Calpine. January 9, 2006.

SJVAPCD (San Joaquin Valley Air Pollution Control District) SJVAPCD 2005f. Offset Equivalency Report. November 18, 2005.

SJVAPCD (San Joaquin Valley Air Pollution Control District) 2006a – Notice of Revision to Final Determination of Compliance (FDOC) (05-AFC-01): Project Number 1052027. January 12, 2006.

SJVAPCD (San Joaquin Valley Air Pollution Control District) 2006b – Revised Permit Conditions 44 and 45, provided by E-mail from Richard Karrs, SJVAPCD to William Walters, Aspen. January 18, 2006.

APPENDIX A

Emissions Reduction Credit requirement.

Condition of Certification AQ-SC7
Required Emission Reduction Credits [a]

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
NO_x Emission Reduction Credits [b]						
Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source	S-2165-2 ~~S-1554-2~~	Pre-1990	104,902 ~~49,372~~	116,451 ~~52,008~~	122,889 ~~50,035~~	113,722 ~~49,586~~
Elk Hills Gas Plant, Kern County	S-1543-2	12/05/1990	10,354	8,381	11,018	11,467
Heavy Oil Projection Fields, Fresno County	C-481-2	3/1/1992	2,525	1,011	0	2,038
VOC Emission Reduction Credits						
757 11th Street, Tracy	N-444-1	1/31/1998	10,996	11,118	11,241	11,232
526 Mettler Frontage Rd. East	S-1666-1	Post-1990	0	0	0	9
~~**PM10 Emission Reduction Credits (NO_x for PM10)**~~						
~~**Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source**~~	~~S-1554-2~~	~~Pre-1990~~	~~52,877~~	~~53,464~~	~~54,052~~	~~54,052~~
SO_2 Emission Reduction Credits						
Midway Premier Lease Section 32, Township 27S, Range 27E	S-1344-5	Post-1990	11,324	11,450	11,575	11,575

Source: (PEFE 2005a); (PEFE 2005h, DR 28)
Note(s):

a. The quantities listed are the required quantities for offsetting, some of the ERC certificates include more credits than those shown and those remaining credits will be maintained by the applicant after surrendering the amounts required as shown above. ERC requirements include all appropriate distance and interpollutant trading ratios.

b. This includes the NOx for PM10 interpollutant offset requirements.

HAZARDOUS MATERIALS MANAGEMENT

Supplemental Testimony of
Alvin Greenberg, Ph.D. and Rick Tyler

INTRODUCTION

Staff has reviewed and considered the applicant's suggested change to proposed Condition of Certification **HAZ-7** regarding infrastructure security. Specifically, the applicant objects to the requirement that a perimeter breach detection system be installed. The applicant claims that it is not necessary and that it is too expensive.

After careful review, staff does not object to the removal of this requirement but wishes to make several observations for the record. Applicant claims that Kern County Homeland Security officials do not feel that perimeter breach detection is needed for this facility and that the cost of such systems is too high. Although staff does not agree with applicant's contentions, staff does agree to remove the requirement from **HAZ-7** because the PEFE location is indeed isolated, approximately 6 miles from a major interstate highway and population.

Staff continues to believe, however, that perimeter breach detection is appropriate for this power plant and strongly urges the applicant to voluntarily install a system for the following reasons:

1. The power plant uses anhydrous ammonia, a hazardous material that has been identified by the US EPA as requiring special site security measures to ensure that unauthorized access is prevented (EPA Chemical Accident Prevention Alert regarding Site Security). The concern involves domestic terrorists, illicit drug manufacturers, and foreign terrorists.

2. The U.S. Department of Homeland Security has designated the U.S. Department of Energy as the lead agency to oversee Critical Infrastructure Protection (CIP) of the energy sector. DOE designated the North American Electric Reliability Council (NERC) to take the lead in providing CIP guidelines for the electricity sector. Towards that goal, NERC published Security Guidelines for the Electricity Sector in 2002 and recommends that electricity sector companies consider installing "perimeter alarm systems to monitor unauthorized intrusion into the facility" (Physical Security Guideline Version 1.0, June 14, 2002, page 2). While this is only a recommendation at this time, the U.S. Department of Homeland Security has indicated that lack of adherence to recommendations in this and other critical infrastructure sectors may cause them to issue these guidelines as regulations. If that occurs, the PEFE facility will be required to install a breach detection system.

3. This power plant will have minimal personnel (3-4 individuals) on-site during the night. Perimeter breach detection would greatly assist them in detecting unauthorized intrusion.

4. Other power plants in California that have minimal staff on-site and yet do not store anhydrous ammonia have opted to install perimeter breach detection systems. These

sites include urban locations as well as rural locations even more isolated than the PEFE facility. Furthermore, projections for development in the I-5 corridor at Grapevine indicate that the PEFE facility may not be as isolated in the future.

5. The FBI Special Agent for Northern California weapons of mass destruction (WMD) assessment agrees with staff that power plants that use anhydrous ammonia should have perimeter breach detection systems.

6. Staff has reviewed and evaluated several perimeter breach detections systems including:
    - Microwave Sensors,
    - Infrared Motion Sensors,
    - Pulsed Infra Red (PIR),
    - Video Motion Detection (VMD),
    - Fence Mounted Acoustic Sensors,
    - Ported or Leaky Coaxial Cable Sensors,
    - Taut Wire, Capacitance Fence Systems,
    - Photoelectric Sensors, and
    - Supersonic Sensors.

    Staff found that very good systems could be purchased for a facility about the size of the PEFE facility for costs ranging from $9,000 to $250,000. These estimates are provided as an attachment to this Supplemental Testimony and some include all costs for hardware installation, soft-ware set-up, and testing.

In summary, at this time staff does not object to revising **HAZ-7,** in accordance with the applicant's Pre-Hearing Conference statement of January 10, 2006, to remove the requirement for a perimeter breach detection system. However, staff **strongly recommends** that the applicant install such a system.

Attachment
Hazardous Materials Supplemental Testimony

General Cost of Perimeter Breach Detector Systems

These estimates were provided for a site of approximately 300 X 800 feet, and represent a broad estimate of costs for equipment, software, and installation (except for the estimate from FLIR).

Company	Equipment Type	Cost Estimate
FLIR Systems (Thermal Imaging)	Infrared Cameras*	$40,000 Not Including Installation**
Infrared Inc.	Infrared Cameras*	$23,000
Secure Strategies International	Cameras with Intrusion Alarm System	$9,000 (Assuming existing control room)
Norris Electro-Optical Systems	Perimeter Sentry (Detection using electro-optical beams)	$250,000

* Infrared cameras show live view of perimeter, and trigger alarms when sensing an intruder using thermal and/or motion detection.
**FLIR stated that installation costs may vary greatly depending on existing site conditions.

SOIL AND WATER RESOURCES

Supplemental Testimony of Linda D. Bond, P.G.

REVISED CONDITIONS OF CERTIFICATION

Discussion during the Pre-Hearing Conference on January 17, 2006 resulted in an agreement between the parties to use the following revised Condition of Certification language.

SOIL&WATER-4: Water used for project operation shall be State Water Project (SWP) water obtained from the Wheeler Ridge-Maricopa Water Storage District's (WRMWSD) excess water sold through the district's pool or shall be banked water obtained from the Kern Water Bank (KWB) that is directly delivered or exchanged for SWP surface water.

~~W~~ The combined water use for Pastoria Energy Facility Expansion (PEFE) and the Pastoria Energy Facility (PEF) shall not exceed the annual water-use limit of 5,000 acre-feet without prior approval by the CPM.

Prior to the use of any water by the PEFE, a metering device shall be installed to monitor and record the volume of water supplied to the PEFE and PEF, combined. The project owner shall either install and maintain a metering device as part of the water supply system or provide evidence that the WRMWSD has installed and will maintain a metering device to monitor water deliveries to the PEFE and PEF, combined. The metering device shall be operational for the life of the project. The project owner shall maintain a record of the total amount of water used by the PEFE and PEF, combined, on a monthly basis.

~~Prior to the use of any water by the PEFE, the project owner shall install and maintain a metering device as part of the water supply system to monitor and record the volume of water supplied to the PEFE. The metering device shall be operational for the life of the project. The project owner shall monitor and record the total water used by the PEFE on a monthly basis.~~

Verification: At least 60 days prior to use of any water source at the PEFE, the project owner shall submit to the CPM evidence that a metering device has been installed on the water supply pipeline serving the PEFE and PEF and is operational. The project owner shall provide a report on the servicing, testing and calibration of the metering devices in the annual compliance report.

The project owner, in the annual compliance report, shall provide a water-accounting summary for PEFE and PEF, combined, that states the source and quantity of water used on a monthly basis in units of gallons per minute and on an annual basis in units of acre-feet. The annual compliance report shall also indicate whether the water was obtained through the WRMWSD's district pool, direct pumping of KWB banked water for delivery to PEFE, or the result of surface water exchanges.

If the amount of water that is to be used by PEFE and PEF, combined, will exceed 5,000 acre-feet per year during any single annual reporting period, the project owner shall provide a written request and explanation for the anticipated water-use increase to the CPM sixty (60) days prior to the date when the water-use limit is expected to be exceeded. If the project owner can demonstrate that the requested increase is necessary and is not caused by wasteful practices or malfunctions in the water processing systems, the CPM shall grant approval for up to one-year increase in the water-use limit for the period requested.

SOIL&WATER-6: ~~The project owner shall submit "Will Serve" letters from the WRMWSD and KWBA to establish a reliable water supply for this Project.~~ The project owner shall document the Pastoria Energy Facility-Pastoria Energy Facility Expansion (PEF-PEFE) facilities-sharing agreement, which includes water supply, water delivery system, and water processing systems, with the CPM prior to the start of commercial operation.

Verification: ~~The project owner shall submit "Will Serve" letters from the WRMWSD and KWBA to the CPM at least thirty (30) days prior to the start of construction of the PEFE.~~ The project owner shall provide a copy of the PEF-PEFE facilities-sharing agreement, which includes the WRMWSD and KWBA water supply contracts, to the CPM at least thirty (30) days prior to the start of construction of the PEFE. The CPM shall receive copies of any amendments to the facilities-sharing agreement as part of the annual compliance reporting.

TRANSMISSION SYSTEM ENGINEERING

Supplemental Testimony of Sudath Arachchige and Mark Hesters

SUMMARY OF CONCLUSIONS

1. The Technical Assessment Study for the Pastoria Energy Facility Expansion Project supports the conclusions in the Final Staff Assessment.
    - No additional new or modified interconnection transmission facilities, other than those proposed by the applicant for the outlet configuration, are required for the interconnection of the 157 MW Pastoria Energy Facility Expansion Project.
    - Southern California Edison (SCE) has proposed to add a new Special Protection Scheme (SPS) or to modify existing Pastoria Energy facility SPS to include the proposed new unit in order to mitigate contingency impacts. If the existing SPS cannot be readily modified and/or requires replacement of the existing SPS equipment, then SCE must consider alternative mitigation measures, such as new transmission reinforcements. The California Independent System Operator (CA ISO) does not recommend the addition of any new SPS due to operational concerns.
    - Except for the modification of an existing SPS and the possible replacement of six circuit breakers, there are no required mitigation measures that are a reasonably foreseeable consequence of the interconnection of the Pastoria Energy Facility Expansion Project. The overloads identified in the System Impact Study occur even without the interconnection of the Pastoria Energy Facility Expansion Project and should be mitigated by SCE even if the proposed project is not built.

INTRODUCTION

Staff developed this Supplement to the staff Transmission System Engineering testimony to incorporate new information from the Technical Assessment Study (TAS) for the Pastoria Energy Facility Expansion Project (PEFE). The Technical Assessment Study was completed by SCE on January 19, 2006 and docketed at the California Energy Commission on January 20, 2006. The Technical Assessment is the final analysis, as approved by the CA ISO on March 7, 2006, that is used to determine the transmission facilities required for the reliable interconnection of the PEFE. The balance of the Facilities Study will include the costs of mitigation arising from the proposed project.

SCOPE OF THE TECHNICAL ASSESSMENT STUDY

SCE performed the PEFE Technical Assessment Study to complete the analysis of the System Impact Study (SIS). The SIS had been provided to the applicant and subsequently filed with the Energy Commission in June 2005. The purpose of the TAS was to determine whether or not SCE's transmission system could accommodate all or part of the PEFE addition when all of the transmission projects triggered by generation projects ahead of the

PEFE in the generation interconnection queue are operating.

The SIS identified base case overloads on SCE's existing Antelope-Mesa and Pastoria-Pardee-Warner 230kV transmission lines as well as the proposed Cottonwind-Antelope 230kV transmission line which would be formed by looping existing Antelope-Magunden No. 2 230kV into a new Cottonwind substation. In addition, the SIS identified a number of single and double outage contingencies which overloaded numerous existing facilities. According to the SIS, mitigating these overloads would require either a new Special Protection System or transmission upgrades. The TAS analyzed the impact of the PEFE on the reliability of the transmission system after the base case overloads were mitigated by the generation projects that trigger or cause the overloads.

TECHNICAL ASSESSMENT STUDY RESULTS

The Technical Assessment Study evaluated a total of six different scenarios that included transmission upgrades required to mitigate overloads caused by generators ahead of the PEFE in the generation interconnection queue. By having the additional transmission line upgrades necessary to support generation projects in the queue ahead of the PEFE:

- All base case overload problems previously identified in the SIS report were eliminated;
- All single contingency overloads identified by the SIS under Heavy Summer load conditions were eliminated;
- Under Light Spring load conditions, all but four single contingencies were eliminated. The remaining four single contingencies which overloaded two transmission lines could be mitigated through a new SPS or modification to the existing Pastoria Energy Facility SPS.
- A total of nine double contingencies impacting six different 230kV transmission lines could be mitigated through the modifications of the existing PEF SPS. The modified SPS would still be within CA ISO limits identified in the SIS.
- The study results indicate that the PEFE increases short-circuit duties by an amount equal or greater than 0.1kA at seven locations, where duty is in excess of 60% of the minimum breaker nameplate rating. Circuit Breakers at the seven locations should be evaluated by SCE Transmission Systems Engineering to determine need for breaker replacement.
- If any of the generators ahead of PEFE in the interconnection queue drop out of the queue, the Technical Assessment may require an update. This update could identify transmission system upgrades that are needed for the reliable interconnection of the PEFE. In the event that any of these earlier queued projects withdraw their application, PEFE may need to assume responsibility for these upgrades.

Transmission upgrades required by earlier-queue projects

The following transmission upgrades are required to eliminate overloads caused by projects ahead of the PEFE in the generator interconnection queue, and were assumed to be operating in the Technical Assessment:

a) Antelope-Cottonwind Upgrades.
   - A new 230kV substation located approximately 20 miles northwest of the Antelope 230kV substation, adjacent to the existing Antelope-Magunden No. 2 230kV transmission line.

- The tear-down and replacement, with a new 230 kV double circuit line, of the approximately 20-mile Antelope-Magunden No. 2 230kV line between the Antelope substation and the new Cottonwind substation.
- Connection of the remaining section of the existing Antelope-Magunden No. 2 230kV transmission line to the new Cottonwind substation.

b) Antelope-Vincent-Rio Hondo-Mesa Upgrades.
- The tear-down of the existing Antelope-Mesa 230kV and Antelope-Vincent 230kV transmission lines.
- Construction of a second Antelope-Vincent 500kV transmission line initially energized at 230kV.
- Construction of a new 500kV transmission line section between the Vincent and the Rio Hondo area on the right-of-way vacated with tear-down of the Antelope-Mesa 230kV transmission line.
- Construction of a new Mesa-Rio Hondo 230kV transmission line.

Mitigation for interconnection of PEF Expansion

The following mitigation measures are required for the reliable interconnection of the PEFE:

a) Modification of the existing PEF Special Protection Scheme, adding the PEFE to the N-2 tripping logic.

b) Evaluation of the circuit breakers at the seven locations identified in Table 3 of the Technical Assessment Study and development of costs for any required breaker replacements.

CONCLUSIONS

- The Technical Assessment Study for the Pastoria Energy Facility Expansion Project supports the conclusions in the Final Staff Assessment:
    - No additional new or modified interconnection transmission facilities, other than those proposed by the applicant for the outlet configuration, are required for the interconnection of the 157 MW Pastoria Energy Facility Expansion Project.
    - SCE has proposed to add a new SPS or to modify existing Pastoria Energy facility SPS to include the proposed new unit in order to mitigate contingency impacts. If the existing SPS cannot be readily modified and/or requires replacement of the existing SPS equipment, then SCE must consider alternative mitigation measure, such as new transmission reinforcements. CAISO does not recommend the addition of any new SPS due to operational concerns.
    - Except for the modification of an existing Special Protection System and the possible replacement of seven circuit breakers, there are no required mitigation measures that are a reasonably foreseeable consequence of the interconnection of the Pastoria Energy Facility Expansion Project. The overloads identified in the System Impact Study occur even without the interconnection of the Pastoria

Energy Facility Expansion Project and should be mitigated by SCE even if the proposed project is not built.

REFERENCES

CA ISO (California Independent System Operator) 2005a. CA ISO review of the System Impact Study for the 157MW Pastoria Expansion, June 29, 2005. Submitted to CEC/Dockets on June 29, 2005.

CA ISO (California Independent System Operator) 2006a. CA ISO review of the Technical Assessment Study for the 157MW Pastoria Expansion, March 7, 2006. Submitted to CEC/Dockets on March 6, 2006.

PEFE (Pastoria Energy Facility Expansion) 2005c. Pastoria Addition System Impact Study by Southern California Edison dated May 13, 2005. Submitted to CEC/Dockets on June 13, 2005

PEFE (Pastoria Energy Facility Expansion) 2005d - Responses to CEC Staff Data Adequacy Request. Submitted to CEC/Dockets on June 6, 2005.

PEFE (Pastoria Energy Facility Expansion) 2006a. Pastoria Addition, Technical Assessment Study by Southern California Edison dated January 19, 2006. Submitted to CEC/Dockets on January 20, 2006.